

Attorney Docket No. 13DV-13810 (07783-0090)

C.) AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions, and listings of claims in the Application.

Claim 1 (Currently Amended): A turbine engine component comprising:
a superalloy substrate;
a bond coat on the superalloy substrate having a thickness in the range of about 0.0005 inch to about 0.005 inch;
an alumina scale overlying the bond coat; and
a thermal barrier coating overlying the alumina scale having a thickness in the range of about 0.0025 inch to about 0.010 inch, comprising at least mischmetal oxide oxides.

Claim 2 (Original): The turbine engine component of claim 1, wherein the thermal barrier coating also comprises another oxide material selected from the group consisting of yttria-stabilized zirconia, zirconia, yttria, hafnia, at least one other rare earth oxide, and combinations thereof.

Claim 3 (Original): The turbine engine component of claim 2, wherein the oxide material is yttria-stabilized zirconia and wherein the percentage of yttria in the yttria-stabilized zirconia is in the range of 4% to 8% yttria by weight.

Claim 4 (Original): The turbine engine component of claim 3, wherein the oxide material is yttria-stabilized zirconia, wherein the percentage of yttria is about 7% yttria by weight, and wherein the thermal barrier coating comprises, based on 100% of weight, up to about 20% ceria by weight, up to about 30% lanthanum oxide by weight, up to about 7% praseodymium oxide by weight, up to about 20 percent neodymium oxide by weight, and balance yttria-stabilized zirconia.

Attorney Docket No. 13DV-13810 (07783-0090)

Claim 5 (Original): The turbine engine component of claim 2, wherein the thermal barrier coating does not contain any yttria-stabilized zirconia.

Claim 6 (Original): The turbine engine component of claim 3, wherein the thermal barrier coating comprises, based on 100% of weight, up to about 20% ceria by weight, up to about 30% lanthanum oxide by weight, up to about 7% praseodymium oxide by weight, up to about 20 percent neodymium oxide by weight, and balance yttria-stabilized zirconia.

Claim 7 (Original): The turbine engine component of claim 1, wherein the thermal barrier coating comprises a bottom layer, a middle layer overlying the bottom layer, and a top layer overlying the middle layer.

Claim 8 (Original): The turbine engine component of claim 7, wherein the bottom layer is 7% YSZ, the middle layer is mischmetal oxide, and the top layer is 7% YSZ.

Claim 9 (Currently Amended): A method for the application of a thermal barrier coating to a superalloy turbine engine component comprising the steps of:
providing an electron beam physical vapor deposition apparatus;
providing a turbine engine component comprising a surface to be coated;
providing a first mischmetal ingot;
providing an second oxide ingot comprising an oxide material selected from the group consisting of yttria-stabilized zirconia, zirconia, yttria, hafnia, at least one other rare earth oxide, and combinations thereof;
placing the component and the ingots into the apparatus;
forming melt pools on the ingots;
drawing oxygen into the apparatus and oxidizing the mischmetal;
dispersing mischmetal oxide vapors and other oxide vapors; and

Attorney Docket No. 13DV-13810 (07783-0090)

depositing the mischmetal oxide vapors and the other oxide vapors onto the surface to be coated, said deposition forming a thermal barrier coating having a thickness in the range of about 0.0025 inch to about 0.010 inch.

Claim 10 (Original): The method of claim 9, wherein the mischmetal oxide vapors and the other oxide vapors are intermittently co-deposited.

Claim 11 (Original): The method of claim 9, wherein the other oxide is yttria-stabilized zirconia, wherein the yttria composition is in the range of about 4% to about 8% yttria by weight.

Claim 12 (Original): The turbine engine component of claim 11, wherein the yttria-stabilized zirconia is about 7% yttria by weight, and wherein the thermal barrier coating comprises, based on 100% of weight, up to about 20% ceria by weight, up to about 30% lanthanum oxide by weight, up to about 7% praseodymium oxide by weight, up to about 20 percent neodymium oxide by weight, and balance yttria-stabilized zirconia.

Claim 13 (Currently Amended): A method for the application of a thermal barrier coating to a superalloy turbine engine component comprising the steps of:
providing an electron beam physical vapor deposition apparatus;
providing a turbine engine component comprising a surface to be coated;
providing a first mischmetal oxide ingot;
providing a second oxide ingot comprising another oxide material selected from the group consisting of yttria-stabilized zirconia, zirconia, yttria, hafnia, at least one other rare earth oxide, and combinations thereof;
placing the component and the ingots into the apparatus;
drawing a vacuum within the apparatus;
forming melt pools on the ingots;

Attorney Docket No. 13DV-13810 (07783-0090)

dispersing mischmetal oxide vapors and other oxide vapors; and
depositing the mischmetal oxide vapors and the other oxide vapors onto the
surface to be coated, said deposition forming a thermal barrier coating having a
thickness in the range of about 0.0025 inch to about 0.010 inch.

Claim 14 (Original): The method of claim 13, wherein the mischmetal oxide
vapors and the other oxide vapors are intermittently co-deposited.

Claim 15 (Original): The method of claim 14, wherein the other oxide is yttria-
stabilized zirconia, wherein the yttria composition is in the range of about 4% to about
8% yttria by weight.

Claim 16 (Original): The method of claim 15, wherein the yttria-stabilized
zirconia is about 7% yttria by weight, and wherein the thermal barrier coating
comprises, based on 100% of weight, up to about 20% ceria by weight, up to about
30% lanthanum oxide by weight, up to about 7% praseodymium oxide by weight, up to
about 20 percent neodymium oxide by weight, and balance yttria-stabilized zirconia.

Claim 17 (Currently Amended): A method for the application of a thermal barrier
coating to a superalloy turbine engine component comprising the steps of:
providing an electron beam physical vapor deposition apparatus;
providing a turbine engine component comprising a surface to be coated;
providing a mischmetal oxide ingot;
placing the component and the ingot into the apparatus;
drawing a vacuum within the apparatus ~~apparatus~~;
forming melt pools on the ingot;
dispersing mischmetal oxide vapors; and

Attorney Docket No. 13DV-13810 (07783-0090)

depositing the mischmetal oxide vapors and the yttria-stabilized zirconia vapors onto the surface to be coated, said deposition forming a thermal barrier coating having a thickness in the range of about 0.0025 inch to about 0.010 inch.

Claim 18 (Currently Amended): A method for the application of a thermal barrier coating to a superalloy turbine engine component comprising the steps of:
providing an electron beam physical vapor deposition apparatus;
providing a turbine engine component comprising a surface to be coated;
providing an oxide ingot comprising mischmetal oxide and another oxide material selected from the group consisting of yttria-stabilized zirconia, zirconia, yttria, hafnia, at least one other rare earth oxide, and combinations thereof;
placing the component and the ingot into the apparatus;
drawing a vacuum within the apparatus;
forming a melt pool on the ingot;
dispersing mischmetal oxide vapors and yttria-stabilized zirconia vapors; and
depositing the mischmetal oxide vapors and the yttria-stabilized zirconia vapors onto the surface to be coated, said deposition forming a thermal barrier coating having a thickness in the range of about 0.0025 inch to about 0.010 inch.

Claim 19 (Original): The method of claim 18, wherein the oxide ingot is a yttria-stabilized zirconia ingot with a mischmetal oxide insert.

Claim 20 (Original): The method of claim 19, wherein the yttria-stabilized zirconia is in the range of 4% to 8% yttria by weight.

Claim 21 (Original): The method of claim 20, wherein the yttria-stabilized zirconia is 7% yttria by weight, and wherein the ingot comprises, based on 100% of weight, up to about 20% ceria by weight, up to about 30% lanthanum oxide by weight.

Attorney Docket No. 13DV-13810 (07783-0090)

up to about 7% praseodymium oxide by weight, up to about 20 percent neodymium oxide by weight, and balance yttria-stabilized zirconia.

Claim 22 (Original): The method of claim 18, wherein the oxide ingot is a mischmetal oxide ingot with a yttria-stabilized zirconia insert.

Claim 23 (Original): The method of claim 22, wherein the yttria-stabilized zirconia is in the range of 4% to 8% yttria by weight.

Claim 24 (Original): The method of claim 23, wherein the yttria-stabilized zirconia is 7% yttria by weight, and wherein the thermal barrier coating comprises, based on 100% of weight, up to about 20% ceria by weight, up to about 30% lanthanum oxide by weight, up to about 7% praseodymium oxide by weight, up to about 20 percent neodymium oxide by weight, and balance yttria-stabilized zirconia.

Claim 25 (Original): The method of claim 18, wherein the oxide ingot comprises a mixture of mischmetal oxide powder and another oxide powder.

Claim 26 (Original): The method of claim 25, wherein the other oxide powder is yttria-stabilized zirconia is in the range of 4% to 8% yttria by weight.

Claim 27 (Original): The method of claim 26, wherein the yttria-stabilized zirconia is 7% yttria by weight, and wherein the oxide ingot comprises, based on 100% of weight, up to about 20% ceria by weight, up to about 30% lanthanum oxide by weight, up to about 7% praseodymium oxide by weight, up to about 20 percent neodymium oxide by weight, and balance yttria-stabilized zirconia.

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Attorney Docket No. 13DV-13810 (07783-0090)

D.) AMENDMENTS TO THE DRAWINGS

None.